Are We So Different?

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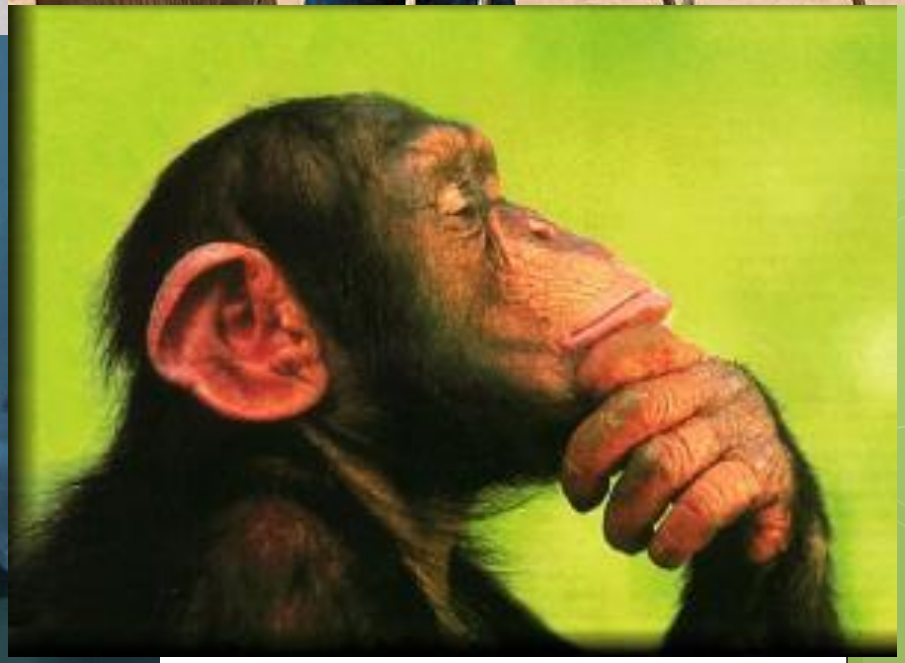


Tale of Contents

What is Cognition?

- According to psychology.about.com, Cognition is defined as “the mental processes involved in gaining knowledge and comprehension.” Categories such as perception, learning, problem solving, reasoning, thinking, memory, language, attention, and emotion are included under cognition.

Are animals capable of cognition?

- Yes! Numerous research projects have been conducted in the field of Animal Cognition to prove otherwise. The goal of our presentation is to elaborate on this question and bring up the research and the men and women behind these studies to bring this proof to light.

Distant Relatives

- Dolphins seem very distantly related to humans. The physical differences are enormous but cognitively, the differences seem to fade. Dolphins are extremely social beings. This alone displays intelligence but numerous other characteristics display a much higher capacity. One researcher has delved into these studies head first and has found out that dolphins have mental capability far beyond what we originally thought.

Dr. Ken Marten

Dr. Ken Marten started his career with dolphins as an observer for the National Marine Fisheries Service aboard large fishing boats. After witnessing mass killings of dolphins aboard the "purse-seine" boats, he devoted his life work to conservation and raising public awareness of how magnificent these creatures and their minds are. Unfortunately, Dr. Marten died in 2010 near his research facility in Hawaii(S. Psarakos, personal communication, July 12, 2010).

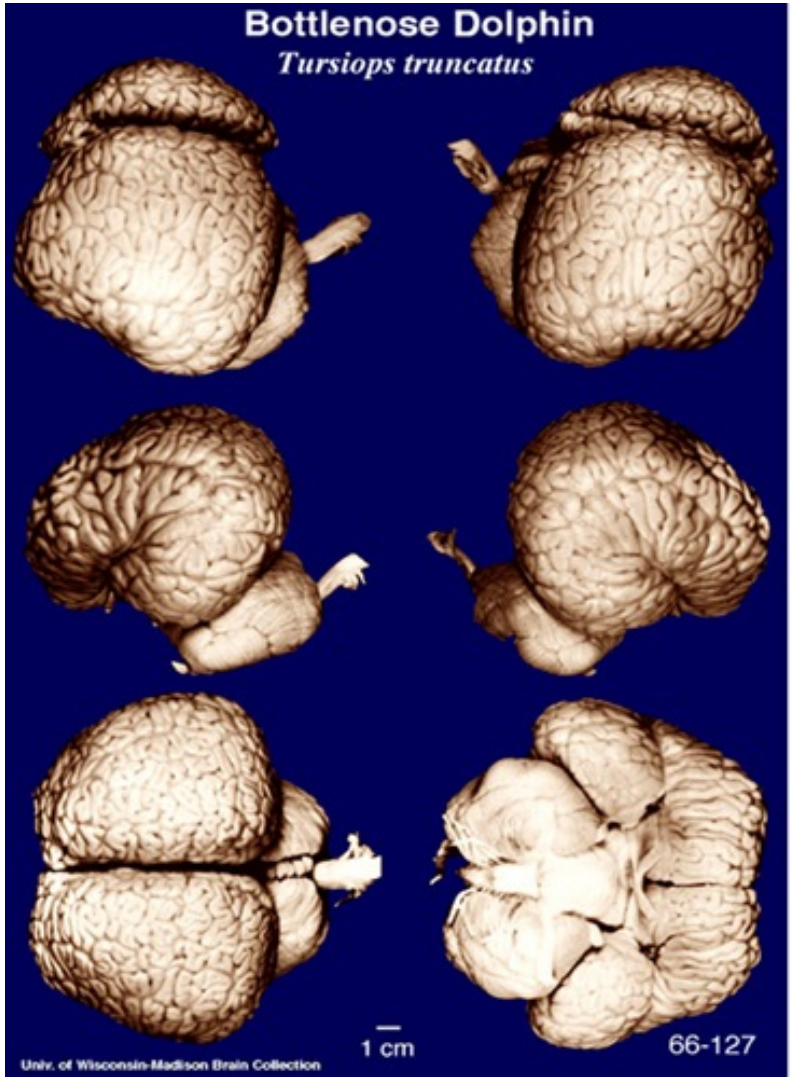
Research Goals

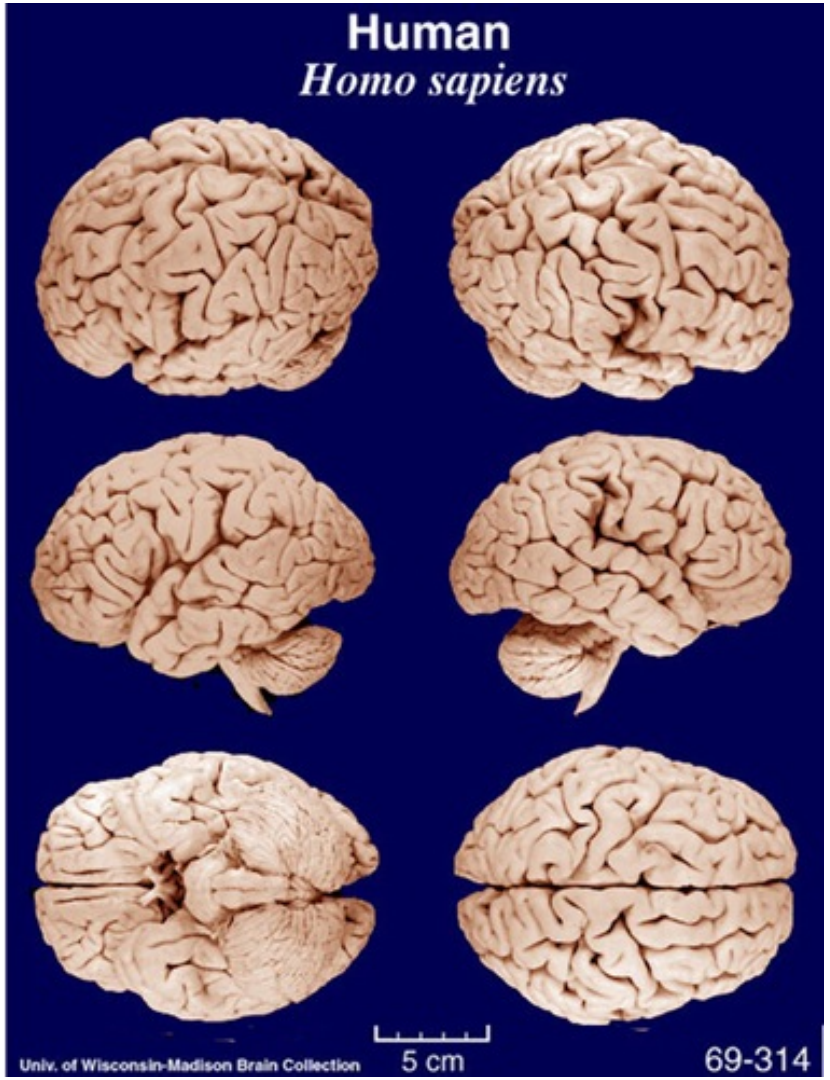
- Through scientific inquiry, develop an understanding of dolphin intelligence and cognition to further scientific knowledge of the subject and increase public awareness and interest in conservation of dolphins and their habitats.

Reflection on Dr. Ken Marten and Project Delphis

- The personal communication written about Dr. Marten's death was the only anecdote about Dr. Marten I could find, but it speaks volumes. Written by his colleague, it briefly explains his early work history as well as his core beliefs. It then sadly states that Dr. Ken Marten passed away July 5th, 2010. The man was extremely well respected and loved in his community.
- The Project Delphis main page details the goals and aspirations of the organization led by the late Dr. Ken Marten. It serves as a brief explanation of the observations and experiments, led by Dr. Marten, and the implications that resulted from them. It is also an appeal to the hearts of readers in that it details the mass fishing and deaths that dolphins face daily. It explains techniques used to catch large amounts of fish, called purse-seine fishing, that many dolphins are captured and killed in. It spurs interest in the subject of dolphin conservation and research and serves as a solid introduction to Dr. Ken Marten's experiments and results.

Brain Comparison





Brain Comparison Reflection

- Initially, this picture didn't stand out to me. My classmate pointed it out and said it would be a great inclusion into our presentation. I originally thought it didn't have much to do with our general topic but as I thought more about it, it did. The picture is a comparison of the Human brain to a Bottlenose Dolphin brain. I never realized how astounding the similarities were. The highly developed cerebrum, common with humans and primates, suggests high cognitive capabilities, and the developed temporal lobes suggest a high level of acoustic perceptional ability. These concepts relate to biopsychology; how the structure and physical workings of the brain translate into cognitive ability. This image is a resounding statement that the gap between animal and human intelligence is not as great as we think.

Observational/Experimental Details

- Mirror/Self View Test
- Television Test
- Separated Communication

Earthtrust's Project Delphis is a dolphin behavior and cognition research

Experimental Outcomes

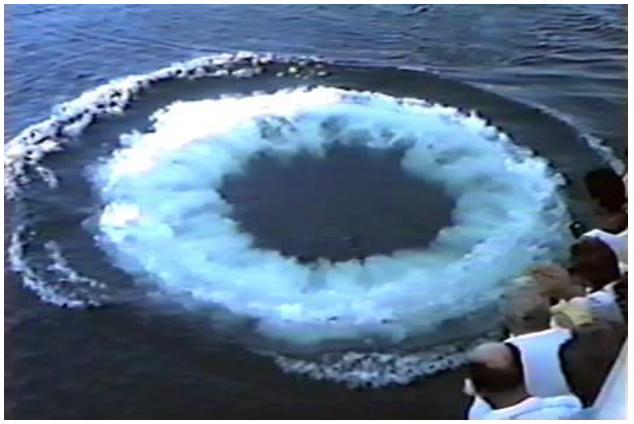
- Mirror/Self View Test – subjects recognized self over another dolphin
- Television Test – Dolphins recognized what was shown on TV as reality rather than fancy lights
- Separated Communication – Separated dolphins showed marked recognition of each other by sound alone

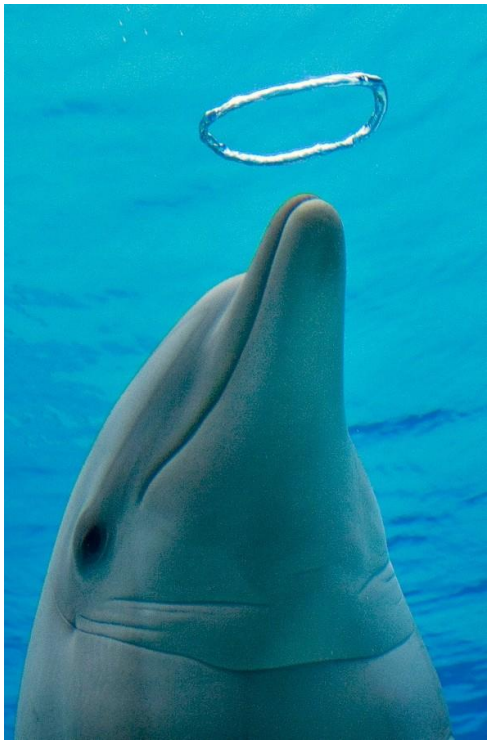
Reflection on Experiments

- This article stood out to me because it is distinct evidence that dolphins are self-aware, which is a facet of higher brain functioning and cognition. The article detailed techniques for cognitive testing of animals in a controlled experiment. The dolphins were marked with a water-proof substance while anesthetized and displayed self-viewing behavior rather than social behavior when in front of a mirror, or viewing themselves on a monitor. So far, this ability has only been seen in apes and humans. This ability further implicates increased perceptional abilities. This evidence shows dolphin perception and cognitive ability is far beyond what we originally thought.

Bubble Sculpting

- Form of play
- Used for hunting





Implications

- The manipulation of environment to create structures for amusement as well as hunting shows remarkable spatial ability as well as in the form of bubble sculpting for hunting and amusement shows remarkable spatial ability. This can also be seen as a form of tool use. A great deal of higher thinking is involved in the creation and manipulation of these structures.

Bubble Sculpting Reflection

- This article is an explanation of the physics behind the amazing ability that the dolphins have to create bubble sculptures. Through the creation of a vortex, the dolphins shoot air into a tube of spinning water. The bubble shifts into a ring of varying size that remains suspended for several seconds. The dolphins can manipulate the size, speed and direction of these sculptures, and manipulate them into spirals ranging over 18 feet long. These structures can also be broken down into smaller rings. This manipulative ability is extremely rare in the animal kingdom. This ability shows that the dolphins possess remarkable spatial cognitive abilities.

The Language of Dolphins

- Early research failed to establish that dolphins had a natural language of their own but showed that the capacity to learn and create one existed.
- More recent research has elaborated on the language capacity of dolphins. They are able to understand 5 to 6 word instructions for performing actions.
- They were also able to remember symbols and gestures for absent objects and individuals.

Language of Dolphins Reflection

- This article details the experiments led by several researchers to uncover the extent to which dolphins are capable of language processing and creation. This is further evidence of the high cognitive abilities of dolphins. The dolphins were able to be taught very specific instructions regarding actions relating to objects in their environment. These instructions totaled to a vocabulary of over 30 words including verbs, adjectives and nouns. When told conflicting instructions, the dolphins showed the ability to differentiate between these conflicts and backtrack through the instructions to find a plausible action to perform. These results display a marked cognitive capacity for language.

Overall Results

- These studies show that dolphins are highly intelligent, highly cognitive animals. These animals display distinct spatial abilities, a high level of perception, the ability to form tools and amusement devices out of their environment and even a rudimentary capacity for language. These inquiries barely tap into the breath of capabilities that the dolphins possess.

Related Video

- http://www.youtube.com/watch?v=TMCf7SNUb-Q

Overall Reflection

- Animal cognition has always been of high interest to me. I believe the extent of knowledge most people hold on the subject is extremely lacking. Most people assume dumb animals are just that; dumb animals, but there are slues of research that show otherwise. I wanted to delve into the subject head first and fully experiance the extent of knowledge on the subject. How much do animals really know? Do they have emotion? Do they have friends, relationships? Or, are they just mindless beings bent on survival and carrying on their respective species. All questions I find myself thinking about quite often and want answers to. I've had extremely close connections to pets and I knew deep down that they had cognitive and emotional abilities that we do not. I wanted answers to these questions and more. The depth of knowledge I found was highly enlightening. I looked into Dr. Ken Marten, a dolphin researcher in the state of Hawaii. His experiments, along with others looked into how intelligent dolphins really are, how much they perceive, their communicative abilities, their spatial abilities, the biopsychology and other more interesting aspects of cognition and intelligence. One of the most interesting aspects of dolphin cognition I found was there use of tools. Dolphins using tools? They don't need opposable thumbs, or hands for that matter. Dr. Marten observed that dolphins are able to manipulate their watery environment to the extent that they can create bubble sculptures. These bubble sculptures don't float to the surface. They are suspended by a vortex created by the dolphins nostrum or snout. The dolphins can break these sculptures into rings that they then bite or break into smaller rings. This manipulation of their environment for the sake of entertainment is amazing in itself. It shows highly developed spatial abilities that, in my opinion no other animal is capable of. But it doesn't end there.

Overall Reflection Cont.

- These bubble sculptures are not just used for amusement. They are also used for hunting. A pod of dolphins will create a bubble net around a school of smaller fish, which herds the fish into tight groups for easier feeding for the dolphins. This pack hunting with use of a created tool is virtually unheard of in the animal kingdom. Other aspects of the dolphins are equally astounding. Their communicative abilities are far beyond what was originally conceived. It is speculated that each dolphin has a signature squeak or sound that represents their unique self. Other dolphins recognize this (or not) and react socially. With these signatures, dolphins can announce themselves or call others, but the signatures are more than just names. Some scientists speculate the signatures can also symbolize specific objects or individuals with emotion attached to them. This symbolizing aspect, is a prime factor in human language. This concept points to the idea that language itself it not something unique to primates but is part of something much more primitive in the evolutionary chain. Other observations made by Dr. Marten suggest self-awareness of dolphins, an attribute originally thought be only present in great apes. The dolphins were marked on the right or left side while anesthetized. After waking up, they were shown a mirror or in real time on a television screen. The dolphins showed marked self-examination over social interaction (Marten, 1995, p. 1). This project has only fueled my interest in the subject of animal cognition. I am not satisfied. I want to know the full extent of what animals perceive and feel. The bond I've held with pets is evidence enough that there is something more to our furry friends then what's in common knowledge. These studies only prove what I've thought all along.

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chimpanzees intelligence

Abstract

The goal of this research is to evaluate Chimpanzee Cognition and intelligence compared to humans. This research presents more details about the animal intelligence studied in class. It starts by introducing the Jane Van Lawick Goodall who performed lots of researches and observations on wild chimpanzees. Later, the chimpanzee's characteristic and behavior is being discussed.

Jane Goodall

- Jane Van Lawick-Goodall, was born in 1934 in London
- She is an authority on wild chimpanzees
- In July 1960, at the age of 26, Jane Goodall traveled from England to Tanzania to start her research on chimpanzees

Jane Goodall

- Several books:
  - In the Shadow of Man (1971)
    - Innocent Killers
  - Through a Window(1990)
- The Jane Goodall Institute

Reflection

- Jane Van Lawick Goodall was an ethologist and also an authority on wild chimpanzees. In 1960, Jane Goodall traveled from England to Tanzania to observe chimpanzee's behavior to start her research. Today, she is directing an Institute for research that is protecting the Gombe chimpanzees at National Park in Tanzania. Jane Goodall has written several books including "In the Shadow of Man" that presents the chimpanzee's society and is the first book showing that chimpanzees are tool-makers. In this book they are presented as peaceful, social and vegetarian. Her other book is "Innocent Killers" that is about spotted hyenas. "Through a Window" is another one of her books that presents chimpanzees in a different way than her earlier works.

Tool Making

- Chimpanzees are one of the few animal species that employ tools.
- Dr. Goodall observed

chimpanzees striping leaves off the stems to extract termites from their nests

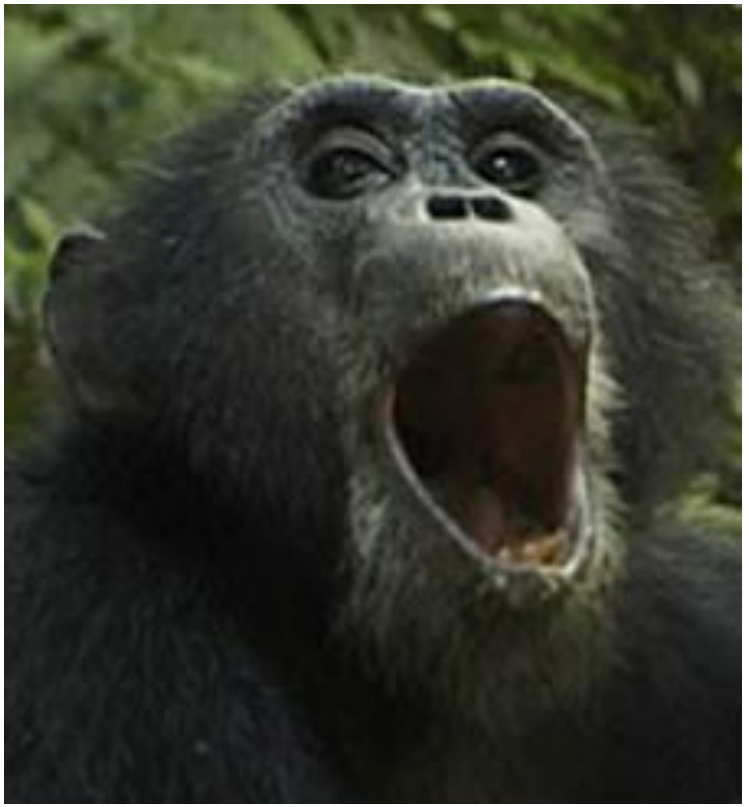
Reflection

- In a research by Dr. Goodall, she observes how chimpanzees strip the stems to make tool for extracting the termites from their nests that explains the ability of tool – making in chimpanzees. That was the first time that an animal other than human were observed to make tool and use it for a specific purpose.

Communication

Chimpanzees communicate with a wide range of verbal and non-verbal communications

- Calls
- Postures and Gestures



Reflection

I mentioned the communication aspect of chimpanzee's behavior in which They create different sound in different situation to communicate to each other.

They also use posture and gesture to communicate. For example, an angry chimpanzee stands up right, swagger, wave its arms and throw branches or rocks.

Social Organization

- Groups and Communities
- Family Bonds
- Dominance Hierarchies & Mating
- Warfare and Violence

Reflection

chimpanzees tend to be in groups like humans, but they sometimes have family bonds as well. These groups join when there is a plenty of food. They also have warfare and violent groups in which chimpanzees brutally fight to each other. This was a very informative subject to me, because I had no information about different communities of chimpanzees.

Diet

- Chimpanzees are not vegetarians as they were thought to be
- Meat makes up less than two percent of their overall diet.
- eat medicinal plants to relieve stomach pains

Reflection

Chimpanzees were thought to be vegetarian, but this project helped me find out that they eat a variety of food including fruits, nuts, seeds, blossoms, leaves and meat. A group of Male chimpanzees sometimes hunt, kill and eat other mammals. In a hunting-process observation by Jane Goodall, they killed and ate a monkey that had climbed up a tree.

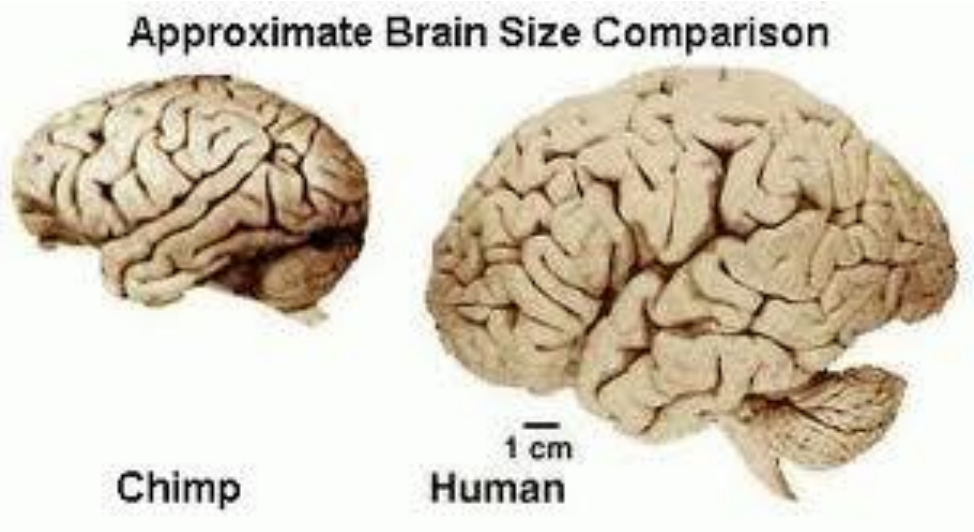
Locomotion

- knuckle-walkers
- climbing, swinging and clinging to branches.
- bipedal locomotion

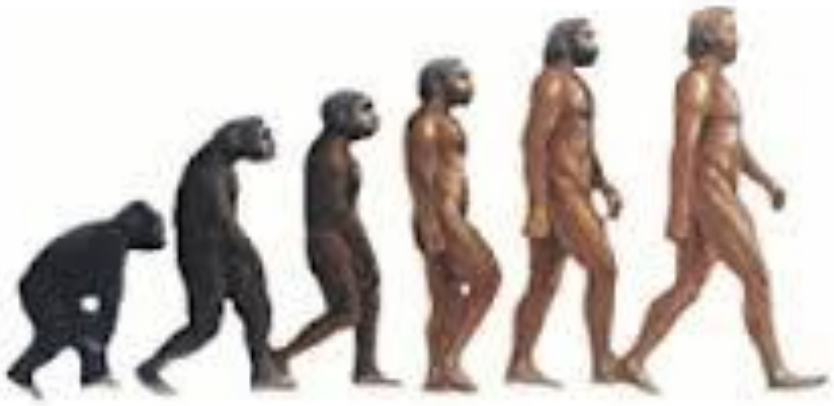
Reflection

Chimpanzee's locomotion was another interesting subject that is classified into three categories: knuckle-walkers, climbing, swinging and clinging to branches and bipedal locomotion. The chimpanzees are called knuckle-walkers, because their arms are longer than their legs, so they walk on the soles of their feet and on the knuckles of their hands. They also use their powerful hands for climbing and clinging to branches. Their bipedal locomotion is the state of walking on two legs that is usually used when they need to carry an object on their hands while traveling a distance.

Brain Comparison



Evolutionary path



Reflection

The picture which is comparing chimpanzee's brain to the human's brain and a evolutionary path from chimpanzees to human being show how similar they are. What I found interesting in this project was comparing chimpanzee's intelligence and behavior to human's and visualizing it in a real life. This project was a great challenge to improve my knowledge about an animal that is very close to human in intelligence, behavior and many other aspects.

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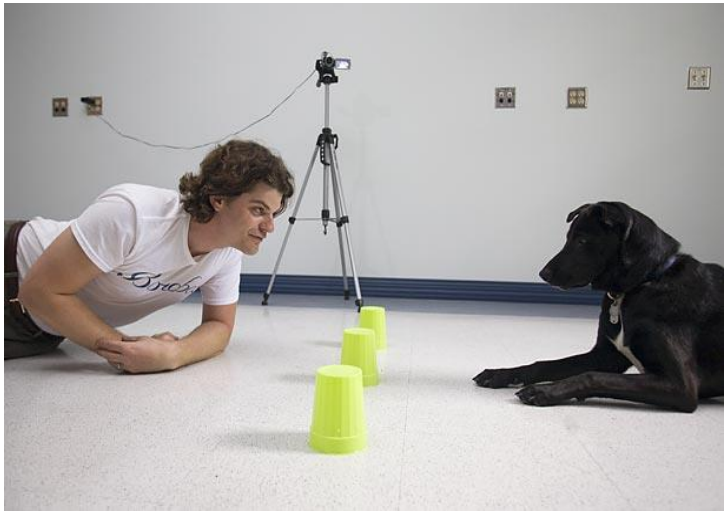
Dog cognition



Max Planck's Researcher Group

Department of developmental and comparative psychology of Max Planck Institute

Research on dog

The goal of this research is to investigate the evolution of different cognitive processes such as:

- Human-dog communication
- Visual perspective taking
- Social learning
- Metacognitive abilities
- Physical Cognition

INTRODUCTION

Dogs have been living with human for 15000 years, therefore these creatures are the best candidate for investigation of different questions. Other studies reveals that dogs are sensitive to attentional state of humans. We also know that dogs understand communicative cues. This ability has not been found in nonhuman primates and wolves.

Human-dog communication

- The group assess the dog's understanding of human communications.

Reflection

- The major point of this study was assessing of understanding of dog of human communications. The researcher member hided food from a dog in one of several containers and then indicate to the dog where the food is by using a cue. Dogs have shown smart skill in making use of human pointing gestures than wolves and even chimpanzees are. They now investigate how dogs perceive such gestures and if they understand their referential nature.
  In addition, they are interested in dogs' ability to comprehend other forms of human communication including object labels and non-linguistic gestures such as symbolic and other non-directional.

Research with dogs. (n.d.). Retrieved from http://www.eva.mpg.de/psycho/dog-cognition.php

Visual perspective taking

- Are dogs sensitive to what others can and cannot see?

Reflection

- In order to understand weather dogs are sensitive to see the objects that present human can not see, a research member set up a barrier from human view. They were interested to see if dogs take advantage of this new situation. It turned out instantly that the dogs eat forbidden food more frequently when the human cannot see them.

Research with dogs. (n.d.). Retrieved from http://www.eva.mpg.de/psycho/dog-cognition.php

Social learning

- How dogs learn from other dogs or human being?

Reflection

- For this study they first allowed the dog to observe other dogs and human to see how do they solve their own problems. Then, dogs were presented with the same problems and watched them to see how do they learn from other to solve their problems.

Research with dogs. (n.d.). Retrieved from http://www.eva.mpg.de/psycho/dog-cognition.php

Metacognitive abilities

- Do dogs have use their own perceptual and knowledge states?

Reflection

- At this point the researchers were interested in how do the dogs use their own knowledge to solve the problems instead of learning from others. For instance, they want to know that are dogs aware of things that have seen in past.

Research with dogs. (n.d.). Retrieved from http://www.eva.mpg.de/psycho/dog-cognition.php

Physical Cognition

- What do dogs know about physical relations?

Reflection

- On this matter the main focus was on how dogs perceive and understand the environment surrounding them. For example, they were interested to see if dogs were able to use typical cues such as food in the cap producing noise when it is shaken?

Research with dogs. (n.d.). Retrieved from http://www.eva.mpg.de/psycho/dog-cognition.php

Overall Result

- The result of this studies reveals that dogs are highly cognitive, intelligence and co-operative with other dogs and human. Dogs passed all tasks shown that they do coordinate the task that they cant do alone.

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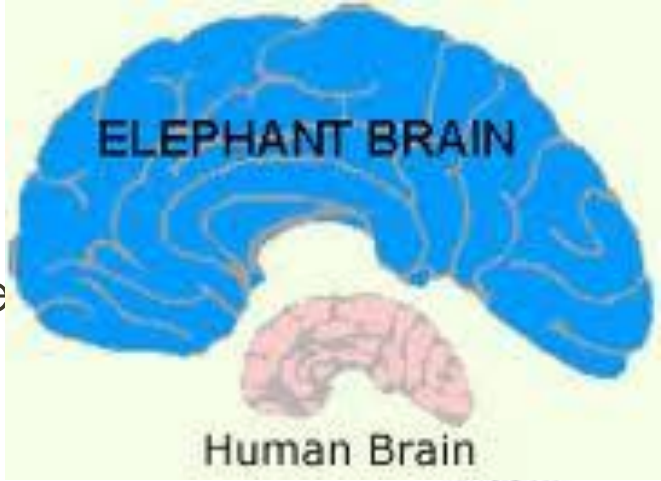
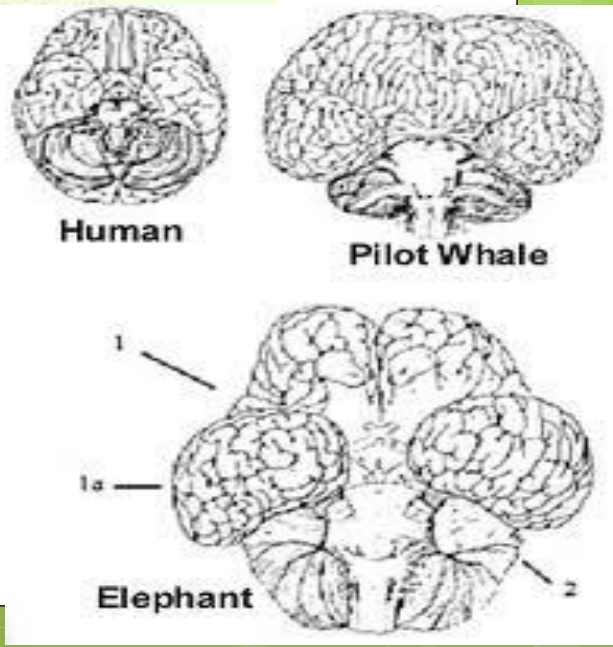
Distant Relatives

- Elephants are amongst the world's most intelligent species.
- Elephants hold enormous potentials in cognitive skills, including those associated with grief, learning, play, altruism, use of tools, compassion, cooperation, self-awareness, memory and language.

The Intelligence of Elephants

- The intelligence potential supported by Elephant's anatomical feature
- Elephant have the largest brain of all terrestrial species. Approximately 5000g.
- The elephant's brain is similar to that of humans in terms of structure and complexity—such as the elephant's cortex having as many neurons as a human brain.





Brain Comparison Reflection

Elephant – one of the most intelligent creatures in the world. Elephants show their brightness through its various behaviors and abilities such as the great memory, training for show and painting, and using tool. Brain, an important complex organ, its structure may directly influence on intelligence. Humans and elephants have three parallel temporal gyri: superior, middle, and inferior. Hippocampal sizes in elephants and humans are comparable, but proportionally smaller in elephant. Elephant adult brain averages 4783 g, the largest among living and extinct terrestrial mammals; elephant neonate brain averages 50% of its adult brain weight (25% in humans). Nevertheless, brain weight is not the only factor affecting elephant's intellect, but the structures and functions in each part of the brain also relate to the brain potential. The cerebral cortex indicates the ability to concentrate like tool use and reason. Temporal lobe is responsible for hearing and auditory memory, vision pathways, learning and emotions. Hippocampus is critical component of the brain associated with the formation and consolidation of new facts and memories, controls emotional processing and neuroendocrine function.

Brain Comparison Reflection cont.

Similarities between human and elephant brains could be due to convergent evolution; both display mosaic characters and are highly derived mammals. Humans and elephants use and make tools and show a range of complex learning skills and behaviors. In elephants, the large amount of cerebral cortex, especially in the temporal lobe, and the well-developed olfactory system, structures associated with complex learning and behavioral functions in humans, may provide the substrate for such complex skills and behavior.

Elephant Emotions

- **Grief**

Elephants remember and mourn loved ones, even many years after their death.

- **Joy**

Joy is an emotion that elephants have no shame in showing.

- **Love**

There is no greater love in elephant society than the maternal kind.

- **Compassion and Altruism**

Observers noted that one African herd always traveled slowly because one of its members had never recovered from a broken leg.

Reflection on Elephant Emotions

Emotion is a response of the whole organism, involving physiological arousal, expressive behaviors, and conscious experience (Meyers, 2013). I find it pretty incredible that elephants are able to express such emotions like joy, love, grief and compassion. For example, elephants have ritual around death. They show a keen interest in the bones of their own kind (even unrelated elephants that have died long ago). They are often seen gently investigating the bones with their trunks and feet while remaining very quiet. Sometimes elephants that are completely unrelated to the deceased still visit their graves.

Through years of research, scientists have found that elephants are capable of complex thought and deep feeling. In fact, the emotional attachment elephants form toward family members may rival our own.

Evidence of elephant intelligence

- Elephant's capacity to use tools;

Reflection on Elephants Using tools

Elephants show a great ability to manufacture and use tools with their trunk and feet. Both wild and captive Asian elephants use branches to swat flies or scratch themselves. They even make appropriate tools by breaking longer branches into shorter ones. Elephants have been observed digging holes to drink water and then ripping bark from a tree, chewing it into the shape of a ball, filling in the hole and covering over it with sand to avoid evaporation, then later going back to the spot for a drink .

Evidence of elephant intelligence

- Elephants can recognize their own reflection in the mirror;

Joshua M. Plotnik

- EDUCATION

Ph.D. and M.A. in Psychology (Neuroscience and Animal Behavior), Emory University (U.S.)

- B.S. in Animal Sciences, Cornell University (U.S.)

http://www.scivee.tv/node/7065

Reflection on Elephant's self-awareness

Researchers reported that elephants can recognize themselves in a mirror, joining only humans, apes and dolphins as animals that possess this kind of self-awareness. One of the researchers, Joshua Plotnik, a graduate student at Emory University in Atlanta, has conducted the experiment at the Bronx Zoo. He reported that they had to use plastic mirrors due to elephants massiveness to avoid breakage. One of the first things animals capable of recognizing themselves in mirrors do is try exploring the other side of the mirror. As they begin to understand mirrors, animals that can recognize their reflections try repeating actions in front of it. The elephants, for example, waved their trunks around and moved their heads in and out of the mirror view. Finally, once animals recognize reflections as their own, they use mirrors to investigate their own bodies. One elephant, named Happy, passed the final test of repeatedly touching an X painted on her forehead, a place she could not see without a mirror. More research is needed to find out when do elephants first develop this capacity. As we know humans start recognizing their reflections at the age of 18 months.

Evidence of elephant intelligence

- Cooperative test
- http://youtu.be/gRpLgQm2p-s

Reflection on Cooperative test

This experiment shows that elephants can learn to coordinate with a partner in a task requiring two individuals to simultaneously pull two ends of the same rope to obtain a reward. Not only did the elephants act together, they also waited for the partners arrival if it was delayed. They also grasped that there was no point to pulling if the partner lacked access to the rope. Such results have been interpreted as demonstrating an understanding of cooperation. Through convergent evolution, elephants may have reached a cooperative skill level on a par with that of chimpanzees (Plotnik, 2010).

Elephants have remarkable memories

- Long memory,
- Remembering individuals,
- Remembering their own kind,
- Social memory,
- Ecological memory

Reflection on Elephant memory

Elephants are extremely intelligent. They have the ability to retain information for a long period of time. They accumulate and retain social and ecological knowledge, and they remember the scents and voices of other individuals migratory routes, special places and learned skills for decades. Elephants remember their own kind, even after many years of separation they still can recognize each other. Older elephants possess extensive knowledge about resources, such as the location of watering areas or regions with seasonally available food as well as knowing how to make appropriate adjustments to these routes.

Elephant Art Gallery

Related Video

- http://www.youtube.com/watch?v=VQYEVQ4w7nw

Reflective Paper: Are We So Different?

Initially, I thought that the idea of animal cognition was boring, but after exploring the subject I found a lot of fascinating information. I have decided to explore the information on elephant intelligence because not long time ago I heard that elephants can paint. I thought that it was pretty incredible. When I have read an article "How Is Elephant Art Made?" I was pretty impressed how quickly they can learn. Of course, not every elephant can paint, so as people: some have talent, some do not. Each elephant painting is an original. "While the elephants are painting they don't just wave their trunks around in the air, splashing paint onto the paper in a 'hit and miss' fashion" (The Elephant Art Gallery, 2012).

Reflective Paper: Are We So Different? Cont.

Elephants actually have spatial awareness and they carefully apply the strokes within the confines of the paper, rarely going over the edges. Another interesting fact that I found about elephant cognition is that they actually express a lot of emotions, such as joy, anger, grief, compassion and love. They lead us, people, to believe that the depth of elephant emotional capacity knows no limit. The next interesting fact about elephants is that they are capable of using tools. If they cannot reach some part of their bodies with their trunk, they may use a tree stick. And if the stick is too long or too leafy elephants may break them in halves to it shorter

Reflective Paper: Are We So Different? Cont.

Elephants can recognize their own reflection in the mirror. Joshua M. Plotnik, one of the researchers of Elephants, has done some test where elephants show there ability of self-awareness and perception. Also, elephants have remarkable memories. They can recognize almost up to 200 individuals, also their own kind. In one of the videos I watched, after 20 years of separation two elephants could recognize each other, they have very strong bond. Elephants are highly intelligent. People and elephants share a strong sense of family and death and they feel many of the same emotions. Each one is, of course, like us, a unique individual with its own unique personality.

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Conclusion

- All of these studies show that all animals in general show a great deal of potential when it comes to intelligence and cognition. All of these studies are detailed examples of animals displaying multiple cognitive abilities. This project left us wanting to know more in the area. There is also tons of more research that should be conducted in this area. We have barely scratched the surface of what there is to know about animal cognition, personality, and their emotional capacity.

Our cognitive cousins

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